INTEGRATED POWER SYSTEM ANALYSIS SOFTWARE

DIgSILENT

PowerFactory 15

What´s New

Version 15.0

DIgSILENT GmbH
Heinrich-Hertz-Straße 9
72810 Gomaringen / Germany
Tel.: +49 (0) 7072-9168-0
Fax: +49 (0) 7072-9168-88
info@digsilent.de

Please visit our homepage at:
`http://www.digsilent.de`

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1 Introduction

This document highlights some of the new key features and enhancements available in *PowerFactory 15.0*. Specific details of all enhancements, including examples, and associated Technical References are available in the *PowerFactory 15* manual.

2 Graphical User Interface

2.1 Project Overview Window

A new Project Overview Window will appear in the main application window which displays an overview of the project allowing the user to assess the state of the project at a glance while also facilitating easy interaction with the key project objects. It gives an overview of study cases, operational scenarios, variations, grids, and triggers.

This improves the fact that in previous versions of *PowerFactory* it was often necessary to interrogate the data manager to ascertain and influence the state of these key project objects. For large projects in particular, this could be a little unwieldy and so the Project Overview Window has been introduced to overcome these difficulties.

Figure 2.1, shows an example of the Project Overview Window.

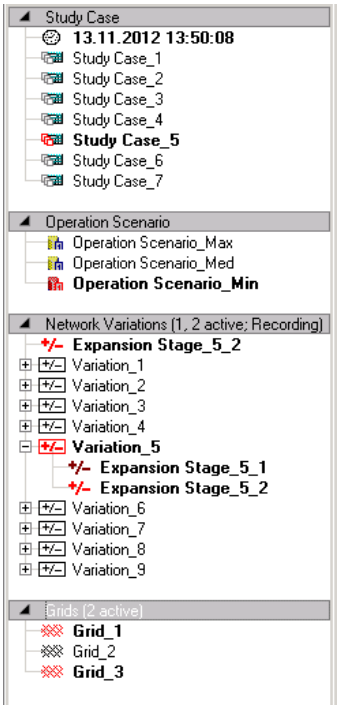


Figure 2.1: Project Overview Window

2.2 Redesign of Main Menu

The Main Menu structure has been re-engineered and consolidated to facilitate the use of *PowerFactory*. The new structure of the main menu is in close accordance with the toolbars. Additional main menu entries have been made available, which were previously only accessible via toolbar icons. Most notably, the new Main Menu item *View* collects functions of the Graphic Board. Also note that several functions moved from the *File* menu to the new *Insert* menu.

2.3 Redesign of Dialogue Tabs

PowerFactory 15.0 introduces a completely new look and feel of the dialogue tabs.

Figure 2.2 represents the changes between *PowerFactory 15.0* and the previous version. The original tabs are now presented as a menu, and the original second page is now presented as a tab.

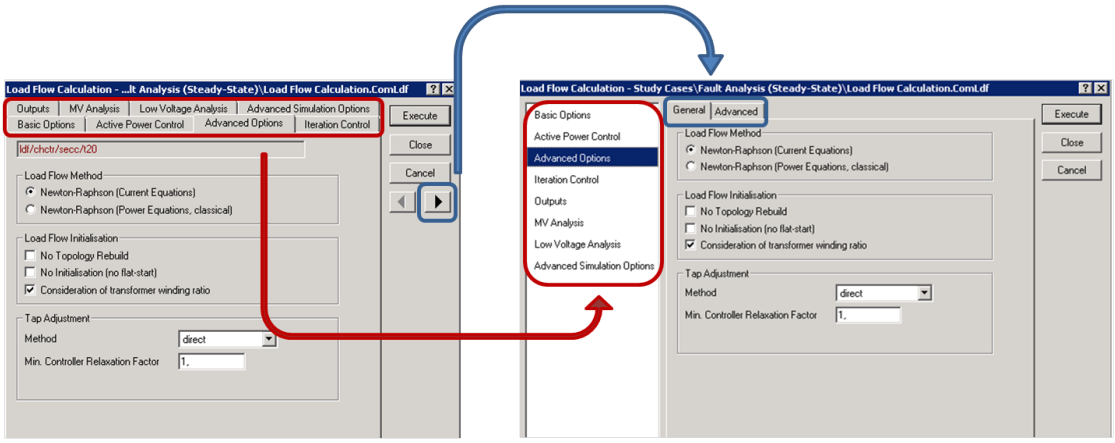


Figure 2.2: Redesign of Dialogue Tabs

2.4 User Profiles: Customizable Toolbars, Menus and Dialogue Boxes

PowerFactory 15.0 includes new functionality to customize the graphical user interface (GUI), including the ability to:

- Fully configure Main Toolbar, Graphic Board Toolbar and Drawing Toolbar. This includes definition of custom DPL Commands and Templates with user-defined icons.
- Customize the element dialogue pages that are displayed.
- Customize element dialogue parameters. Parameters can be *Hidden* (not shown) or *Disabled* (shown but not edited).
- Customize Main Menu and context-sensitive menu commands.

Customization is done with user Profiles.

Profiles are created in the *Configuration* → *Profiles* folder by selecting the *New Object* icon and then *Others* → *Settings*→ *Profile*. An Administrator can create and customize profiles, and control User/User Group selection of profiles from the *Profile* tab of each user group.

Profiles can be used to configure toolbars, menus, dialogue pages, and dialogue parameters.

Figure 2.3 illustrates aspects of the GUI that may be customized using Profiles.

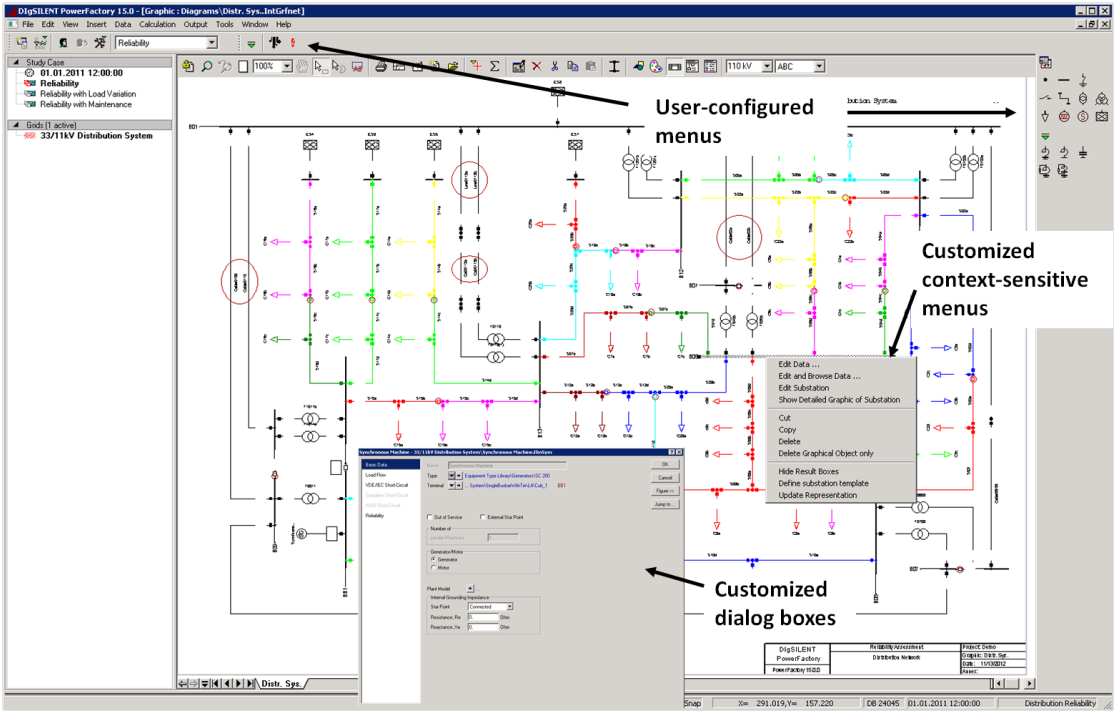


Figure 2.3: Toolbars and Dialogue Boxes Customization

2.5 Standard and Base Package User Profiles

PowerFactory 15.0 already comes with two pre-defined profiles: “Base Package” and “Standard”, these are selectable from the main menu under *Tools* → *Profiles* (See Figure 2.4).

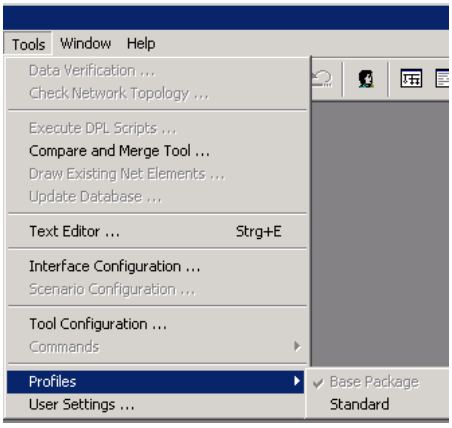


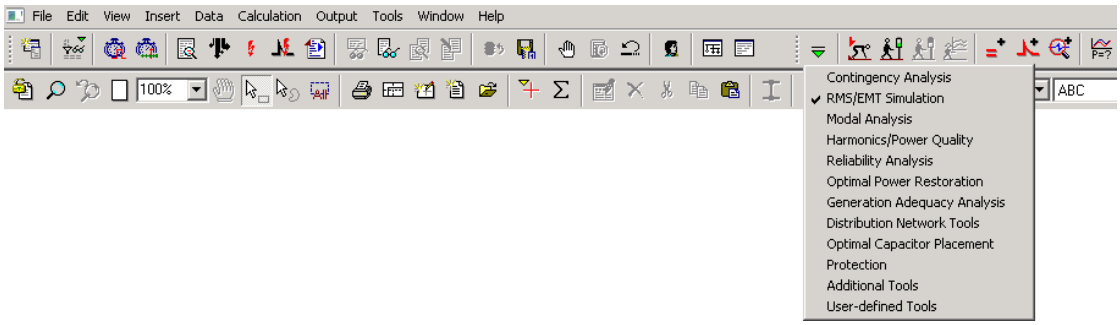
Figure 2.4: User Profiles

Selecting the “Base Package” profile limits Main Menu entries and icons shown on the Main Toolbar to those that are used with the Base Package of the software. The “Standard” profile includes the full graphical user interface for all available *PowerFactory* functions. Figures 2.5a

and 2.5b show the main Toolbar for the Base Package and the Standard profile, respectively.

File Edit View Insert Data Calculation Output Tools Window Help
Contingency Analysis
Additional Tools
User-defined Tools

(a) Base Package Profile



(b) Standard Profile

Figure 2.5: Standard and Base Package User Profiles

3 Network Graphics

3.1 Geographic Diagrams

PowerFactory 15.0 comes with a new Geographic Diagram concept. A Geographic Diagram can be generated with a 1-click action via Main Menu *Insert* → *Geographic Diagram*, once GPS coordinates of the network components are available (see *Description* tab of Branches/Lines and Substations/Terminals).

Geographic Diagrams support background maps of various common projection types. The graphical symbol, e.g. the circle's displayed size of a substation, is independent of the zoom level — an elegant approach to ensure that graphics are easy to view as the user zooms in and out of the diagram. Besides, it can be adjusted from which scale level texts and result boxes become visible.

For better identification of load/generation clusters, new special layers "Load/Generation Distribution" have been introduced that graphically represent the magnitude of network load and generation with circles of proportional sizes.

An example of a Geographic Diagram is shown in Figure 8.1.

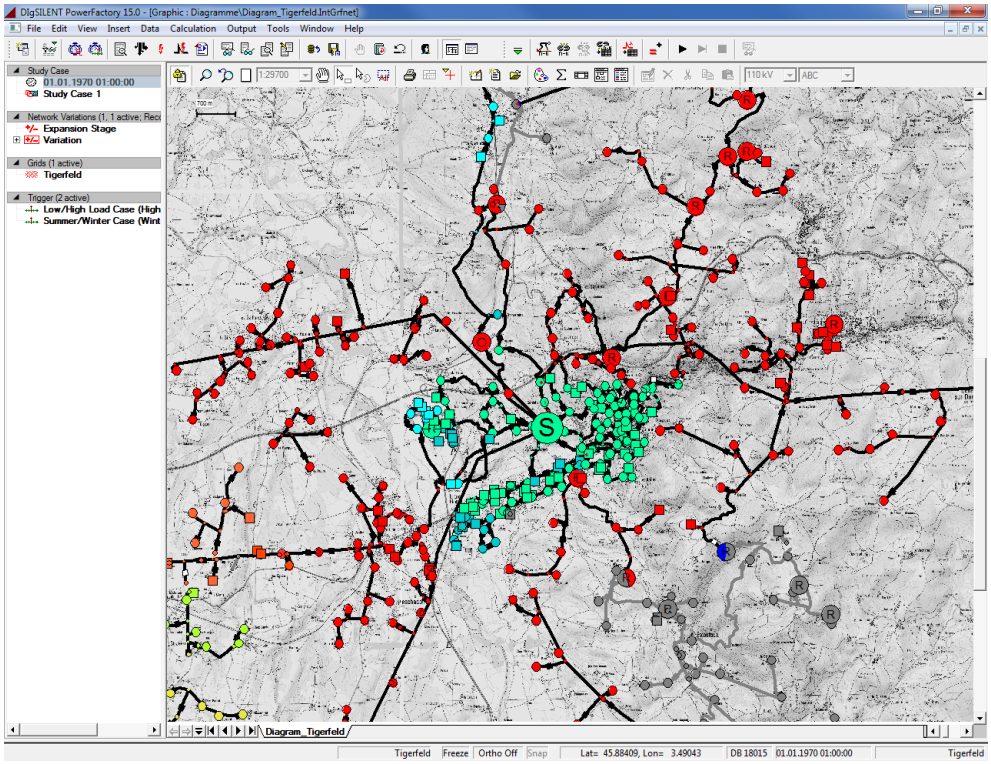

DIgSILENT PowerFactory 15.0 - [Graphic : Diagramme\Diagram_Tigerfeld.IntGrfnet]
File Edit View Insert Data Calculation Output Tools Window Help
Study Case
01.01.1970 01:00:00
Study Case 1
Network Variations (1, 1 active; Rec
Expansion Stage
Variation
Grids (1 active)
Tigerfeld
Trigger (2 active)
Low/High Load Case (High
Summer/Winter Case (Wint
Diagram_Tigerfeld
Tigerfeld Freeze Ortho Off Snap Lat= 45.88409, Lon= 3.49043 DB 18015 01.01.1970 01:00:00 Tigerfeld

Figure 3.1: Geographic Diagram

3.2 Colouring Modes

Several new features are included for Single Line Diagram colouring modes:

- Support of *Continuous Colouring* modes. This colouring option interpolates displayed colours on Single Line Diagram between predefined discrete colour tables, e.g. for Voltages/Loading.
- New colouring modes, including modes for Primary Equipment such as *Year of Construction*, *Cross Section*, *Forced Outage Rate/Duration*, as well as topology information such as colourings according to *Supplying Substation* or *Supplying Transformer* are available.
- Extension of the *Voltages/Loading* colouring mode to visualize *Voltage Drop and Voltage Rise* in feeders of a distribution network are provided.
- New alarm colouring modes, such as *Feeder Radiality Check*: When a Feeder has been defined as *Feeder is supposed to be operated radially*, an alarm colouring mode is available to indicate whether or not the feeder is actually operated radially. If not, the Feeder (including the non-radial path) will be highlighted on the single line diagram.

3.3 Miscellaneous

- In addition to the known Rectangular Selection of network elements in the single line graphic, *PowerFactory 15.0* introduces a new *Free-Form Selection* tool.

- Improved *Automatic Drawing of Substations*: If no diagram information is available for equipment inside a substation, new algorithms are available to provide an optimized layout for an automatically generated diagram.

4 Data Management

4.1 Variations and Expansion Stages

PowerFactory 15.0 introduces an ”Error Correction Mode” to facilitate recording of network data changes in the relevant Expansion Stage, even though it may not be the Recording Expansion Stage.

Consider an example where a line of length 10 km is added in ”Expansion Stage 1”, and other changes, to an independent section of the network, are made in ”Expansion Stage 2”. As determined by the Study Time, both Expansion Stages are active, and ”Expansion Stage 2” is the recording stage. Now, the user wishes to correct the length of the line added in ”Expansion Stage 1” from 10 km to 12 km. Rather than modifying the Study Time, it is possible to make the change with ”Error Correction Mode” enabled, and the change will be recorded to the expansion stage, in which the line was introduced, i.e. to ”Expansion Stage 1”.

The ”Error Correction Mode” is accessible via the Project Overview Window, Network Variations, as showed in Figure 4.1

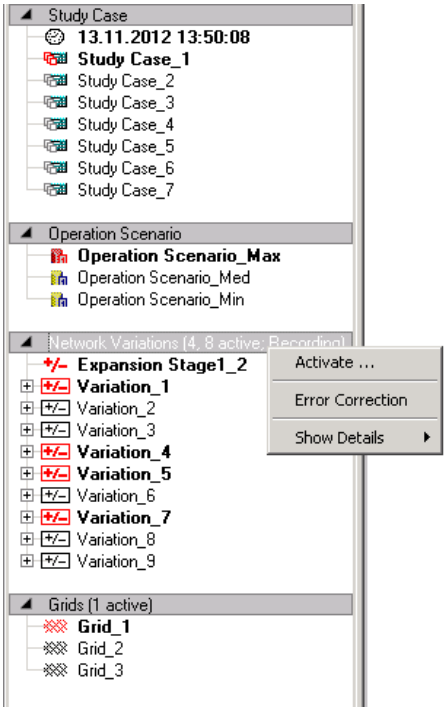


Figure 4.1: Error Correction Mode

4.2 External References

PowerFactory 15.0 include a new option to *Pack External References* of a project. Using this function, all external references of a project are resolved by copying the reference objects to a local folder called ”External”. In addition, the user may define locations which shall be omitted in checking for external references.

This new function helps avoiding problems when sharing projects with third party users that may/should not have access to, e.g., certain libraries.

5 Database and License Server

5.1 Offline Mode

PowerFactory 15.0 provides the ability to work in *Offline Mode* when a network connection to the multi-user database server and license server is unavailable. An illustration of the architecture for the Offline Mode is depicted in Fig. 7.1.

The required project data is cached to the user's local machine, which can then later be synchronized to the server database. *Offline Mode* functionality includes the ability to lock and unlock projects, edit projects, and limit the database size on the computer(s) working in offline mode.

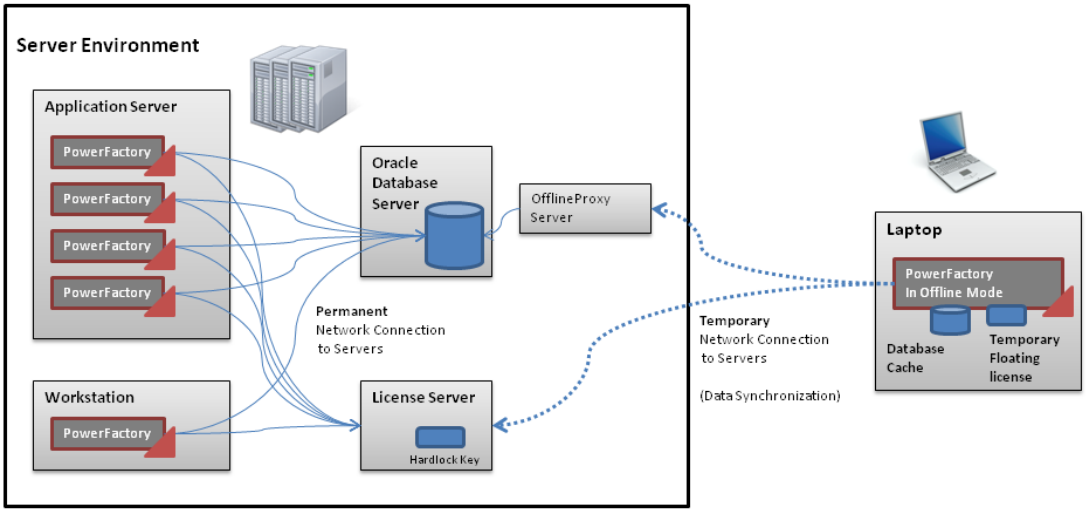


Figure 5.1: Architecture for Offline Mode

5.2 Housekeeping

PowerFactory 15.0, for multi-user databases, offers the ability to execute some project administration via a scheduled overnight housekeeping task. In this way project purging, emptying of user recycle bins and deletion of old projects can be automatized. This can let users activate projects more quickly and also speed up quitting *PowerFactory*. Moreover, housekeeping moves heavy data processing to off-peak periods, offering better performance for normal daytime users.

5.3 Selective DB Migration

When upgrading to *PowerFactory 15.0*, it is necessary to migrate the *PowerFactory* database to the new version. For very large databases this can take significant processing time. If the database contains many projects that are no longer needed, *PowerFactory 15.0* offers means to shorten the migration time by migrating just the projects that the user wants to keep, according to selection criteria. Selective Migration is only available for multi-user databases (e.g. Oracle, SQL Server).

5.4 User Authentication on License Server

The license server can now be configured to grant licenses only to a list of named *PowerFactory* users.

6 General

6.1 Calculation Modes

In *PowerFactory 15.0* distinct calculation modes are better supported. In particular, *PowerFactory* distinguishes any Load Flow based calculation method (such as Contingency Analysis, Sensitivity Analysis, Optimal Power Flow, etc.) which allows for improved predefined results in single line diagrams and flexible data pages, as well as better adaption of colouring modes.

6.2 Invalidation of Calculation Results

Under *User Settings*, there is a new option for *Invalidation of Calculation Results*. The user can optionally select to *Show last results*. When selected, modifications to network data or switch status etc. will not invalidate the calculation results. The results will instead be shown on the single line diagram and on flexible data pages in grey until the user invalidates the results (e.g. by selecting *Reset Calculation*, or conducting a new calculation).

6.3 Flexible Data Page

In *PowerFactory 15.0*, the user may customize the number format per column in the Flexible Data Page. Also, the names of the headers for the individual columns are user-definable (refer to Chapter ”Data Manager” in the User’s Manual for more information about how to customize the Flexible Data page).

6.4 Variable Selection

PowerFactory 15.0 introduces a completely new look and feel of Variable Set dialogue. An example of the variable set object is shown in Figure 6.1. Here the variable set for a load (red circle) is shown. *PowerFactory 15.0* distinguishes more function types for better grouping of the calculation quantities (see also Section 6.1). In this case an RMS simulation (green circle) is to be performed and the total active and the reactive power flowing to the load are going to be

monitored (blue circle). Moreover, selection now can be made by ticking the boxes next to the variables, thus, the variable description texts remain visible.

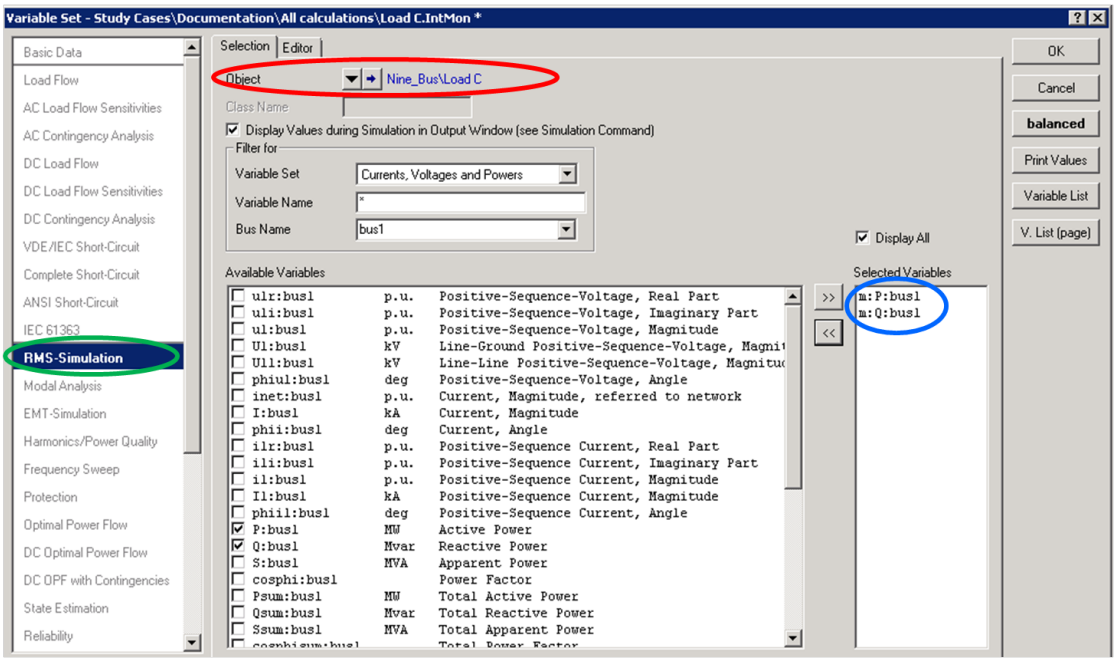


Figure 6.1: Variable Selection

More information about the Variable Selection could be found in the User's Manual, Chapters "Study Cases" and "Reporting and Visualizing Results".

6.5 Hot Keys

PowerFactory 15.0 includes new Hot Keys for Load Flow and Short-Circuit calculation, as well as for reset calculation.

- **Load Flow**: Press **F10** for a Load Flow calculation, and **Crtl+F10** to edit the Load Flow options.
- **Short-Circuit**: Press **F11** for a Short-Circuit calculation, and **Crtl+F11** to edit the Short-Circuit options.
- **Reset Calculation**: Press **F12**.

7 Reliability Analysis Functions

7.1 Reliability Assessment

The *Reliability Assessment* function has been largely improved in *PowerFactory 15.0*.

7.1.1 Optimal Power Restoration

The algorithms for Power Restoration in distribution networks have been further improved. Power Restoration is now incorporating *Tie Open Point Optimization* methods to achieve an utmost level of resupply. I.e., *PowerFactory* is automatically evaluating — as part of the Power Restoration strategy — the benefits of any move of tie open points in any neighboring feeder.

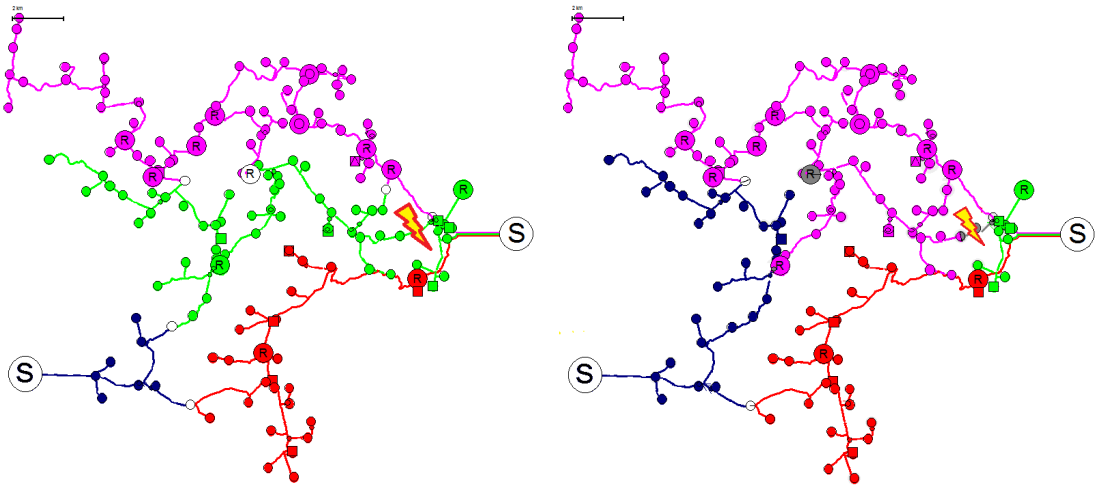


Figure 7.1: Example for Optimal Power Restoration strategy incorporating a reconfiguration of Tie Open Points: The two pictures show the initial situation and the restored case, respectively, for a fault occuring at the marked location in the green feeder.

7.1.2 Unbalanced Calculations

Reliability calculations now supports both, balanced and unbalanced network representations.

7.1.3 Feeder Constraints

In addition to Thermal Constraints and Voltage Constraints, the *Reliability Assessment* calculation provides an option to consider feeder Voltage Drop/Rise Constraints. This is particularly important in distribution networks with high portions of generation, where bidiretional power flows may occur.

7.1.4 Reliability Indices

Reliability Indices can be calculated based on subscribed power.

7.1.5 Load Distribution States

In *PowerFactory 15.0*, a new *Distribution Curve* object has been introduce. Such an object may be used to define the Load Distribution (for a year) measured at a given substation. *Reliability Assessment* will automatically calculate its indices based on this distribution. This largely improves the accuracy of the results compared to a worst-case scenario consideration.

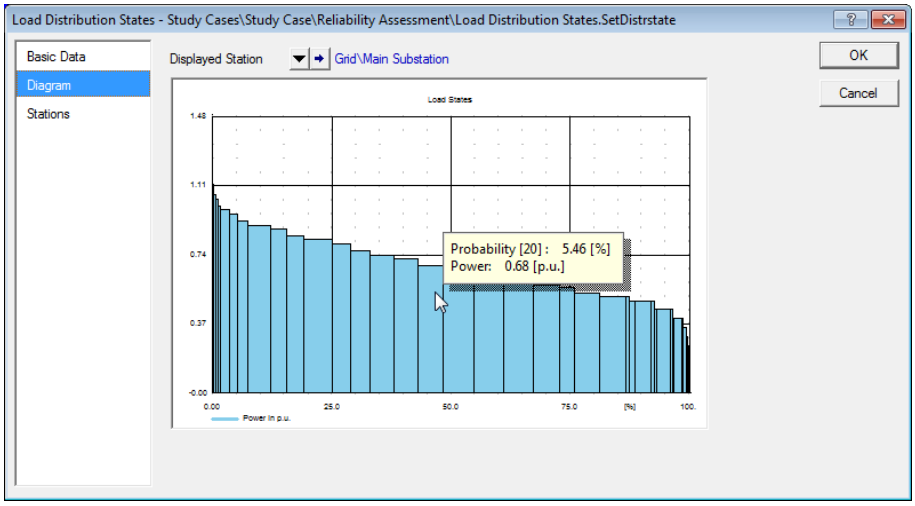


Figure 7.2: Example of a discretized load distribution curve

7.1.6 Tariffs

The addition of *Time Tariffs* and *Energy Tariffs* provide enhanced flexibility to define load interruption costs for *Reliability Assessment*.

7.2 Optimal Power Restoration

In *PowerFactory 15.0*, a new module *Optimal Power Restoration* is available. The corresponding toolbar is depicted in Fig. 9.1.

Optimal Power Restoration studies can be conducted for single case to obtain a ”Recovery Scheme Report” — even in the case where no failure data is available for the network components. This function includes the feature to trace the stages of the restoration and view the impacts of the restoration on the single line graphic. An optimal power restoration strategy can be quickly performed for a single case by right-clicking a single element and selecting *Calculate→Optimal Power Restoration*.

Figure 7.3: Optimal Power Restoration toolbar with options for tracing and reporting.

8 Distribution Network Tools

8.1 Tie Open Point Optimization

In *PowerFactory 15.0*, further improvements are provided for the *Tie Open Point Optimization*.

- *Tie Open Point Optimization* now supports both balanced and unbalanced network representations.

- New objective functions have been made available. Besides the classical ”Minimization of Losses”, the user may now also chose to optimize the tie open points for a best-fit with regards to ”Minimization of (certain) Reliability Indices”, such as SAIFI or ENS. Combined cost curves for costs of losses and the costs of reliability impacts are also available.
- The user may select the switch types (circuit-breaker, disconnector, switch disconnector, load-break-switch) and control types (remote controlled, indicator of of short circuit, manual) to be considered by the *Tie Open Point Optimization* command.

8.2 Voltage Profile Optimization

PowerFactory 15.0 introduces a new *Voltage Profile Optimization* for Distritbution networks with potential bidirectional power flow due to embedded generation conditions.

The new *Voltage Profile Optimization* command calculates an optimization of distribution transformer tap change positions with consideration to the range of expected load and generation conditions. Expected voltage drop and voltage rise conditions in the LV grids are taken into account, allowing for a combined study of MV and LV voltage profiles.

An improved voltage profile plot facilitates the visualization of results.

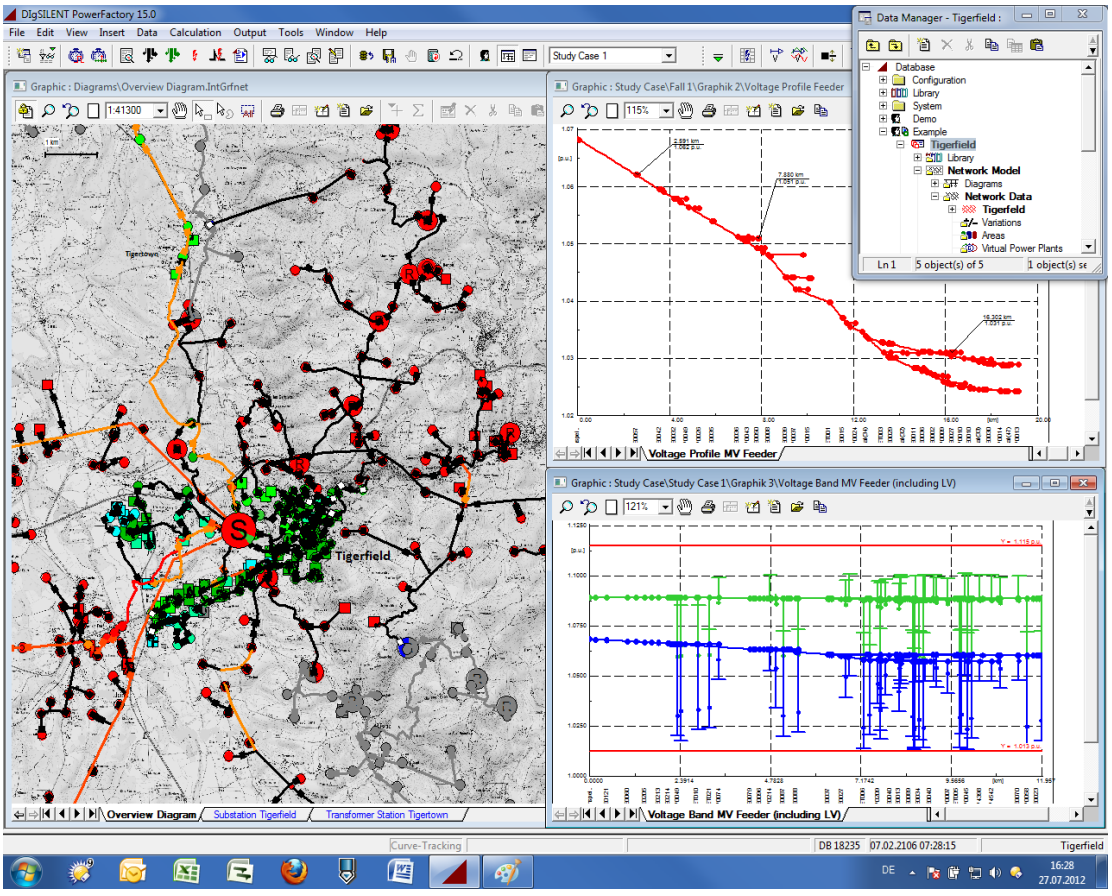


Figure 8.1: Example of a Voltage Profile Optimization for bidirectional power flows: The voltage profile plots simultaneously show load (blue curve) and generation (green curve) case studies including worst-case voltage drops and rises at LV feeder ends.

8.3 Backbone Calculation

The new *Backbone Calculation* command facilitates the determination (and visualization) of the main connections between meshed feeders. Various methods are available to determine backbones, ranging from purely topological criteria, and cross-section analysis, to more sophisticated methods that score quality of power restoration.

Besides, new backbone objects have been introduced with calculation quantities that give valuable insight into the structure and potential power restoration of a distribution grid.

8.4 Optimal Remote Control Switch (RCS) Placement

A new *Optimal RCS Placement* function is introduced which optimizes the RCS locations within feeders to minimize Energy Not Served (ENS), balance ENS, or minimize Expected Interruption Costs (EIC).

The command allows to produce the results in a new variation for easy comparison of before-and-after optimization results.

Remote controlled switches can nicely be visualized in the single line diagram with the aid of a corresponding newly introduced graphic layer.

9 Cable Sizing

9.1 Cable Reinforcement

The *Cable Reinforcement* analysis has been further improved:

- The analysis can be performed on a network model without any cable types previously defined. *PowerFactory* will assign types from the selected library, with consideration to the specified loading and voltage drop constraints.
- The *Cable Reinforcement* method includes a function to report on the short-circuit loading of lines and cables.
- A *Cable Reinforcement* analysis can be performed on unbalanced networks.

9.2 Automatic Cable Sizing

PowerFactory 15.0 provides a new functionality to perform Cable Sizing optimization in accordance with various international standards.

The *Cable Sizing* command can be executed on a network model, balanced or unbalanced, with or without any cable types previously defined. *PowerFactory* will assign types and calculate cable ratings according to the selected international standard, such as

- IEC 60364-5-52
- BS 7671

- NF C15-100
- NF C13-200

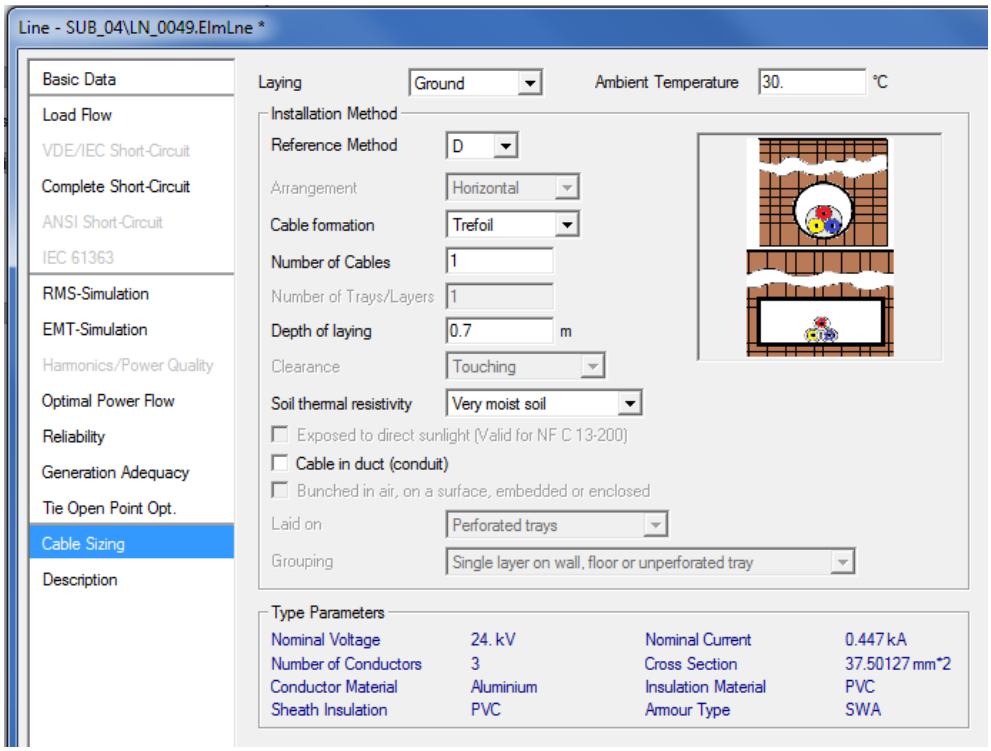


Figure 9.1: Cable Sizing input dialogue of a cable

10 Techno-Economical Calculation

PowerFactory 15.0 introduces a new techno-economical calculation to perform an economic assessment of network expansions through an analysis of:

- The cost of electrical losses.
- The economic impact of failure rates (reliability).
- Investment costs (including initial costs, initial value, scrap value, and expected life span).
- Project timing.

The output of the Techno-Economical Calculation is the Net Present Value (NPV) of the project over the selected period. The command can optionally reconfigure the network at each step of the calculation to minimize losses (using the Tie Open Point Optimization command).

11 Protection

11.1 Tabular Relay Settings Reports

PowerFactory 15.0 introduces a completely new tabular reporting format which vastly improves the protective device setting reporting capability of the software. With the previous approach ASCII reports for protection settings were generated in the output window which were not able to deal with the structure of complex relay models. Furthermore the settings could not easily be exported to other software environments like Microsoft Word or Excel. The new tabular report command (ComTablereport) overcomes these problems by generating pre-configured tabular outputs customized to the protective device class.

11.2 Relay Settings Input

It is now possible to enter reach settings for distance relay zones in terms of Primary Amperes or Secondary Amperes. This functionality gives the user flexibility to configure distance relay models as required by their particular application or according to the restrictions of the relay model.

11.3 Short Circuit Trace

The *Short Circuit Trace* is a tool based on the complete short circuit calculation method that allows the user to examine the performance of a protection scheme in response to a fault or combination of faults; where the response is examined in time steps and where at each time step, the switching outcomes of the previous time step and the subsequent effect on the flow of fault current, is taken into consideration.

12 Arc-Flash Hazard Analysis

PowerFactory 15.0 introduces new tools to conduct *Arc-Flash* hazard assessments:

- *Arc-Flash* calculations can be conducted in accordance with *IEEE-1584 2002* and *NFPA 70E 2008* standards.
- *Arc-Flash* calculations can be performed using globally or individually specified circuit-breaker tripping times, or protection clearing times based on actual protection settings. The calculation takes into account the arc resistance when determining protection clearing times.
- Incident Energy and PPE requirements can be displayed on the Single Line Graphic.
- *PowerFactory* automates the preparation of *Arc-Flash* labels based on the calculation results. An example label produced using the default template is shown in Figure 8.1.

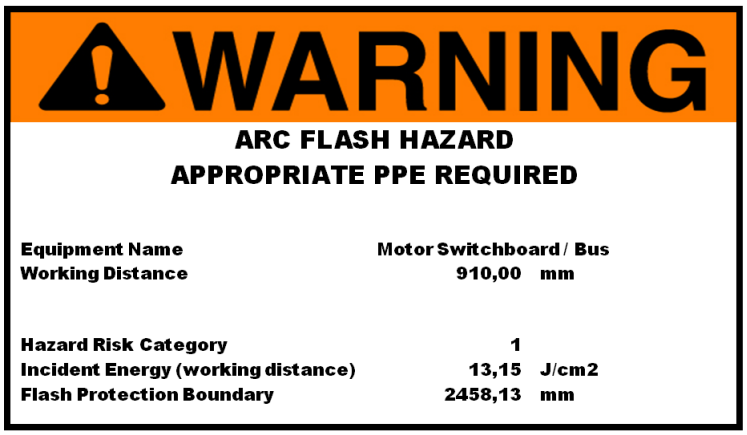


Figure 12.1: Example Arc-Flash Label

13 Motor Starting

In addition to dynamic motor starting simulations, *PowerFactory 15.0* introduces the ability to perform static motor starting simulations to assess motor voltages before, during, and after starting, and to assess whether starting is successful.

14 Simulation Scan

PowerFactory 15.0 comes with new *Simulation Scan* modules to monitor network results and parameters during time-domain simulations. Multiple modules, monitoring the same or different quantities, can be defined for a given simulation. If a defined limit is exceeded, an action to display an output message or a “Stop Simulation” event can be triggered (likewise a trip generator in the case of the loss of synchronism scan module). Limits that can be monitored are as follows:

- Frequency maximum and minimum limits.
- Synchronous machine loss of synchronism.
- User-selected parameter maximum and minimum limits.
- Voltage maximum limit and maximum voltage violation time, and minimum limit and minimum voltage violation time.
- Voltage recovery and voltage recovery time.

Fig. 14.1 illustrates the smooth integration of the *Simulation Scan* functionality into the existing simulation module.

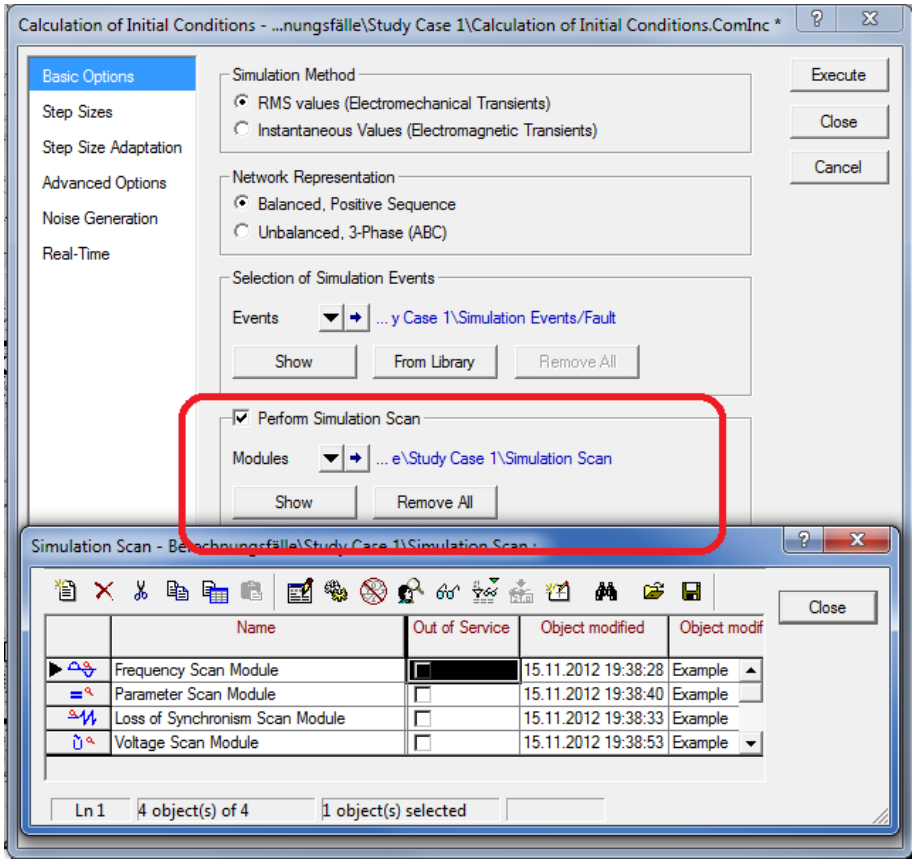


Figure 14.1: Simulation Scan objects monitoring simulation results with various trigger conditions.

15 Models

15.1 Secondary Substation

PowerFactory 15.0 includes a new Secondary Substation object. The application provides templates ( ) with a broad variety of predefined secondary substation configurations.

15.2 MV Load Model

PowerFactory 15.0 includes a new MV Load model, representing a distribution transformer together with a reduced load/generation model.

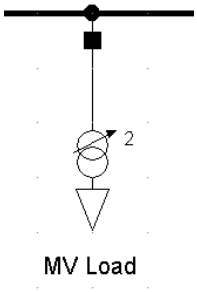


Figure 15.1: MV Load Model

15.3 Voltage Transformer Model Enhancements

In *PowerFactory 15.0* the following new models are supported:

- Detailed VT Model:

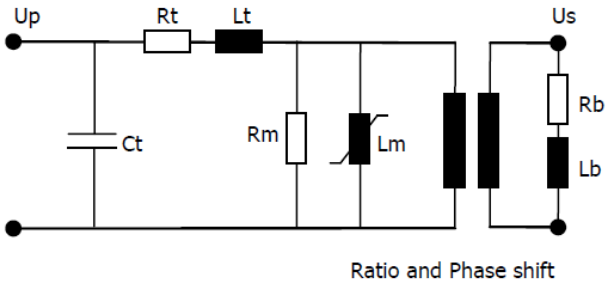


Figure 15.2: Detailed VT Model

- Detailed CVT Model (Capacitive Voltage Transformer):

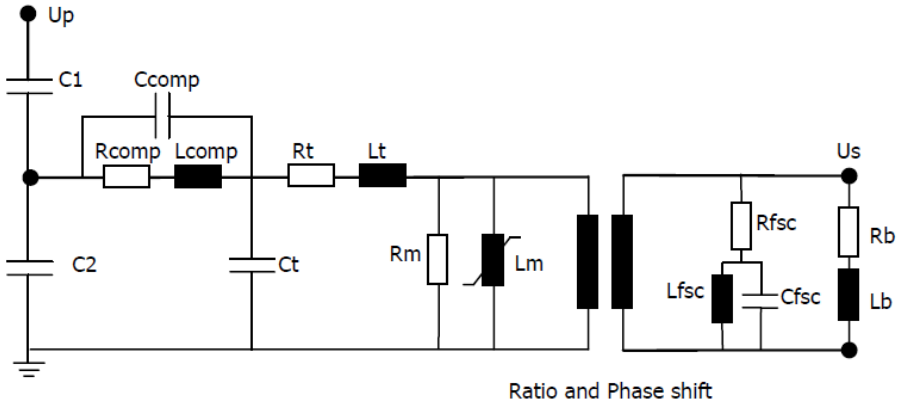


Figure 15.3: Detailed CVT Model

15.4 Static Generator Model Enhancements

The following enhancements are available in *PowerFactory 15.0*:

- New Single Phase and Single Phase-Neutral Model
- The 3-phase model can now be used as a Reference Machine (Slack) in load flow calculation
- Frequency-Dependence of $r2$, $x2$ and $r0$, $x0$ for harmonic calculation

15.5 PLL Model Enhancements

- New Single Phase and Single Phase-Neutral Model
- Support of blocking in under-voltage condition

15.6 Asynchronous Motor Model Enhancements

For *Motor Starting* the following enhancements are supported:

- Starting ”Reactor”
- Starting ”Auto Transformer”
- Support of ”speed” or ”time” trigger in *Motor Starting* methods

15.7 Series Capacitor Model Enhancements

For Spark Gap Model a built-in tripping unit is now supported including the following tripping criteria:

- Trip according to current or voltage
- For Metal Oxide Varistor: Trip according to current or MOV Energy/MOV Power

15.8 Cable Parameter Calculation Enhancements

- Cable definition can now be selected as type in the line
- Improvements for cross-bonded cables
- Improvements for reduction of insulation layers
- Coordinates of circuits in pipe are represented in polar coordinates (see Fig. 15.4)
- Material selection in accordance with IEC60287 (see Fig. 15.5)
- Support of segmental conductors

- Frequency characteristic for the definition of the AC resistance of the conductor

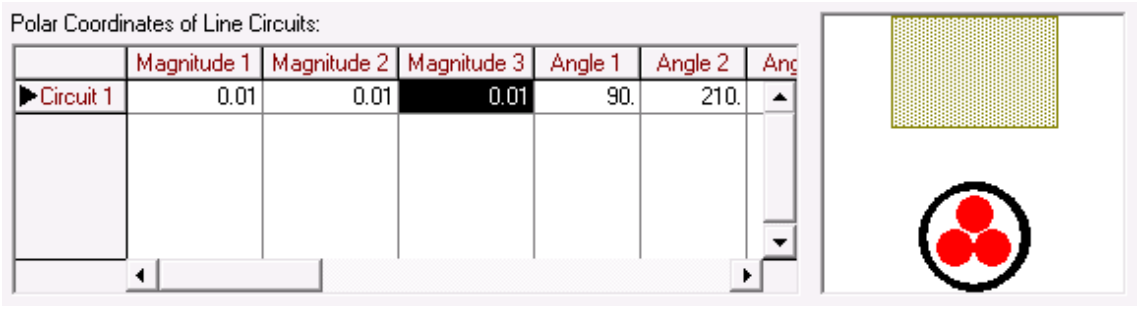


Figure 15.4: Polar Coordinates

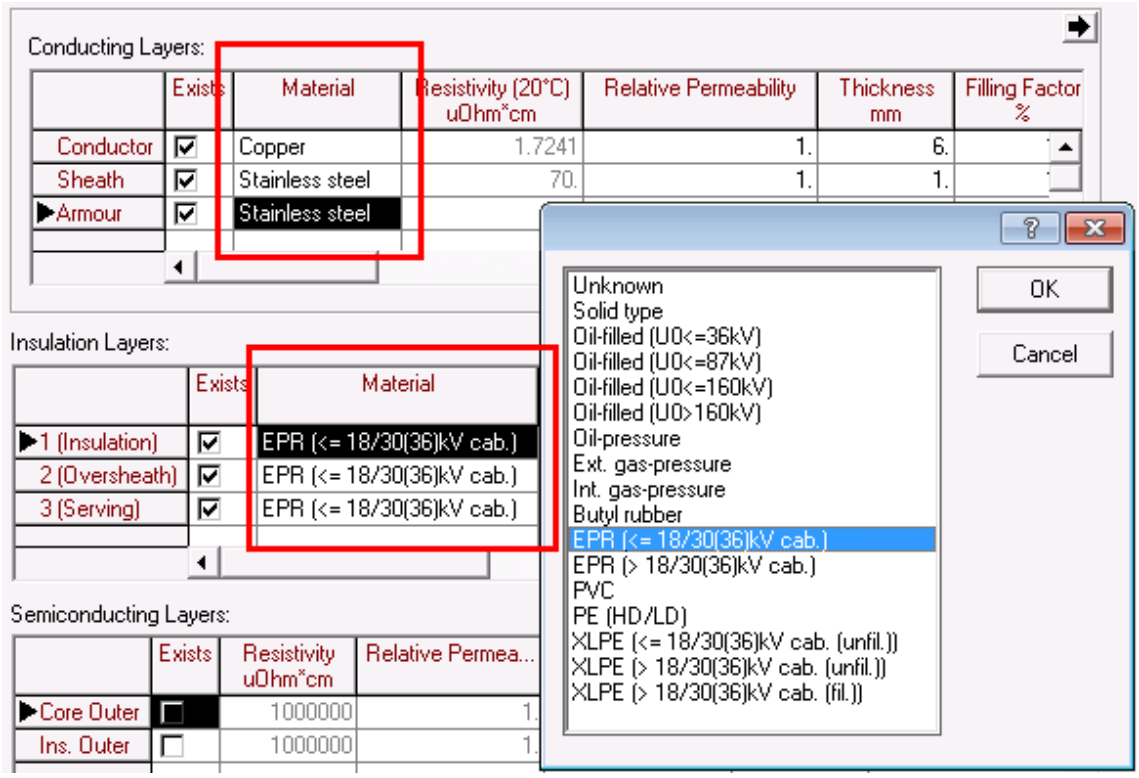


Figure 15.5: Material Selection

15.9 2- and 3-Winding Transformer Model Improvements

- Transformer measurement tables now include zero-sequence impedance data
- Additional input option ”Reactance and Resistance in p.u.” for transformer types

15.10 Station Controller Model Enhancements

PowerFactory 15.0 supports various additional control methods:

- Support of $cosphi(P)$-Characteristic
- Support of $Q(V)$-Characteristic
- Reactive Power Distribution according to Voltage Setpoint Adaption
- Now also supporting PWM Converters

15.11 External Grid Model Enhancements

For *Harmonic Analysis* the following model extensions are available:

- Support of S_{kV}, psi_{kV} input parameter
- Support of Harmonic Voltage Table
- Support of IEC6100 Background Harmonics
- Frequency dependence for $R1$,$L1$,$R0$,$L0$,$R2$,$L2$

15.12 AC-Voltage Source Enhancements

For *Harmonic Analysis*, Background Harmonics are supported according to IEC6100.

16 Documentation

The vastly revised User Manual is now presented in PDF format, which makes it easier to navigate and to find specific topics in the document.

DIgSILENT GmbH

Company Profile

DIgSILENT GmbH is a consulting and software company providing engineering services in the field of electrical power systems for transmission, distribution, generation and industrial plants.

DIgSILENT GmbH was founded in 1985 and is a fully independent, privately owned company located in Gomaringen/Tübingen, Germany. DIgSILENT continued expansion by establishing offices in Australia, South Africa, Italy, Chile, Spain and France. Thereby, facilitating improved service following the world-wide increase in usage of its software products and services. DIgSILENT has established a strong partner network in many countries such as Mexico, Malaysia, UK, Switzerland, Colombia, Brazil, Peru, China and India. DIgSILENT services and software installations have been conducted in more than 110 countries.

DIgSILENT PowerFactory

DIgSILENT develops the leading integrated power system analysis software PowerFactory, which covers the full range of functionality from standard features to highly sophisticated and advanced applications including wind power, distributed generation, real-time simulation and performance monitoring for system testing and supervision. For wind power applications, Power Factory has become the power industry's de-facto standard tool, due to PowerFactory models and algorithms providing unrivalled accuracy and performance.

DIgSILENT StationWare is a reliable central protection settings database and management system, based on latest .NET technology. StationWare stores and records all settings in a central database, allows modelling of relevant workflow sequences, provides quick access to relay manuals, interfaces with manufacturer specific relay settings and integrates with PowerFactory software, allowing for powerful and easy-to-use settings co-ordination studies.

PowerFactory Monitor is a flexible performance recording and monitoring system that copes easily and efficiently with the special requirements for system test implementation, system performance supervision and the determination and supervision of connection characteristics. Numerous Monitoring Systems installed at various grid locations can be integrated to a Wide-Area-Measurement-System (WAMS). PowerFactory Monitor fully integrates with the PowerFactory software.

DIgSILENT Consulting

DIgSILENT GmbH is staffed with experts of various disciplines relevant for performing consulting services, research activities, user training, educational programs and software developments. Highly specialised expertise is available in many fields of electrical engineering applicable to liberalised power markets and to the latest developments in power generation technologies such as wind power and distributed generation. DIgSILENT has provided expert consulting services to several prominent wind-grid integration studies.

DIgSILENT GmbH
Heinrich-Hertz-Straße 9
72810 Gomaringen
Germany
T +49 7072 9168-0
F +49 7072 9168-88
mail@digsilent.de
www.digsilent.de